

# **International Building Code® (IBC)** **(IBC-2012 Guidelines)**

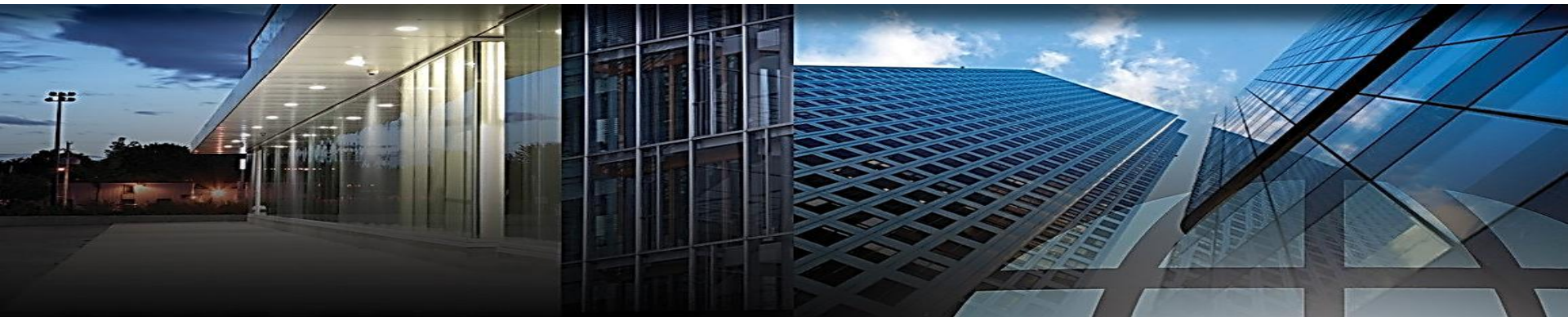


**Presented by:**

**Arch. Mohamed Mostafa Abo-Auf**

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# Introduction

Internationally, code officials recognize the need for a modern, up-to-date building code addressing the design and installation of building systems through requirements emphasizing performance.

The International Building Code<sup>®</sup>, in this 2012 edition, is designed to meet these needs through model code regulations that safeguard the public health and safety in all communities, large and small.

This comprehensive building code establishes minimum regulations for building systems using prescriptive and performance-related provisions.

# Introduction

It is founded on broad-based principles that make possible the use of new materials and new building designs.



This code is fully compatible with all of the International Codes<sup>®</sup> (I-Codes<sup>®</sup>) published by the International Code Council (ICC)<sup>®</sup>, including the International Energy Conservation Code<sup>®</sup>, International Existing Building Code<sup>®</sup>, International Fire Code<sup>®</sup>, International Fuel Gas Code<sup>®</sup>, International Green Construction Code<sup>®</sup> (to be available March 2012), International Mechanical Code<sup>®</sup>, ICC Performance Code<sup>®</sup>, International Plumbing Code<sup>®</sup>, International Private Sewage Disposal Code<sup>®</sup>, International Property Maintenance Code<sup>®</sup>.



# Introduction

Also, the International Residential Code<sup>®</sup>, International Swimming Pool and Spa Code<sup>®</sup> (to be available March 2012), International Wildland-Urban Interface Code<sup>®</sup> and International Zoning Code<sup>®</sup>.



# How could you read/search in the IBC

To read or search in the IBC you may need to follow the below guide steps, of course because you are not required to memorize the code:

1. In the first you need to read the key points for each chapter.
  2. You will read in a quick each chapter contains.
  3. Read and imagine the easy guide slides in the end of this presentation.
- After that you will have a strong background about the IBC and ready to find what you want from the code.



**These slides are just collected and organized to be as a guide for you, and all the key points and sections (Text and numbers) are taken from the code (IBC 2012) as it is without any modifications.**

# 1. SCOPE AND ADMINISTRATION

## ➤ KEY POINTS:

Chapter 1 establishes the limits of applicability of the code and describes how the code is to be applied and enforced. Chapter 1 is in two parts, Part 1-Scope and Application (Sections 101-102) and Part 2-Administration and Enforcement (Sections 103-116).

Section 101 identifies which buildings and structures come under its purview and references other ICC codes as applicable. Standards and codes are scoped to the extent referenced (see Section 102.4).

The building code is intended to be adopted as a legally enforceable document and it cannot be effective without adequate provisions for its administration and enforcement. The provisions of Chapter 1 establish the authority and duties of the code official appointed by the jurisdiction having authority and also establish the rights and privileges of the design professional, contractor and property owner.



# 1. SCOPE AND ADMINISTRATION

## ➤ CHAPTER PRELIMINARIES:

### ☐ Part-01-Scope & Application:

- General
- Applicability

### ☐ Part-02- Administration & Enforcement:

- Department of Building Safety
- Duties and Powers of Building Official
- Permits
- Floor and Roof Design Loads
- Submittal Documents
- Temporary Structures and Uses



- Fees
- Inspections
- Certificate of Occupancy
- Service Utilities
- Board of Appeals
- Violations
- Stop Work Order
- Unsafe Structures and Equipment

## 2. DEFINITIONS

### ➤ KEY POINTS:

All terms that are defined in the code are listed alphabetically in Chapter 2. Terms are defined in Chapter 2. Defined terms that are pertinent to a specific chapter are also listed in that chapter. While a defined term may be listed in one chapter or another, the meaning is applicable throughout the code.

Codes are technical documents and every word, term and punctuation mark can impact the meaning of the code text and the intended results. The code often uses terms that have a unique meaning in the code and the code meaning can differ substantially from the ordinarily understood meaning of the term as used outside of the code. Where understanding of a term's definition is especially key to or necessary for understanding a particular code provision, the term is shown in italics wherever it appears in the code.

## 2. DEFINITIONS

### ➤ KEY POINTS:

This is true only for those terms that have a meaning that is unique to the code. In other words, the generally understood meaning of a term or phrase might not be sufficient or consistent with the meaning prescribed by the code; therefore, it is essential that the code-defined meaning be known.

Definitions are deemed to be of prime importance in establishing the meaning and intent of the code text that uses the terms. The user of the code should be familiar with and consult this chapter because the definitions are essential to the correct interpretation of the code and because the user may not be aware that a term is defined.

### ➤ CHAPTER PRELIMINARIES:

- General
- Definitions



# 3. USE AND OCCUPANCY CLASSIFICATION

## ➤ KEY POINTS:

Chapter 3 provides for the classification of buildings, structures and parts thereof based on the purpose or purposes for which they are used.

- Section 302 identifies the groups into which all buildings, structures and parts thereof must be classified.
- Sections 303 through 312 identify the occupancy characteristics of each group classification.

In some sections, specific group classifications having requirements in common are collectively organized such that one term applies to all. For example, Groups A-1, A-2, A-3, A-4 and A-5 are individual groups for assembly-type buildings. The general term “Group A,” however, includes each of these individual groups. Other groups include Business (B), Educational (E), Factory (F-1, F-2), High Hazard (H-1, H-2, H-3, H-4, H-5), Institutional (I-1, I-2, I-3, I-4), Mercantile (M), Residential (R-1, R-2, R-3, R-4), Storage (S-1, S-2) and Utility (U). In some occupancies, the smaller number means a higher hazard, but that is not always the case.

# 3. USE AND OCCUPANCY CLASSIFICATION

## ➤ KEY POINTS:

Defining the use of the buildings is very important as it sets the tone for the remaining chapters of the code. Occupancy works with the height, area and construction type requirements in Chapters 5 and 6, as well as the special provisions in Chapter 4, to determine “equivalent risk,” or providing a reasonable level of protection or life safety for building occupants. The determination of equivalent risk involves three interdependent considerations:

- (1) the level of fire hazard associated with the specific occupancy of the facility.
- (2) the reduction of fire hazard by limiting the floor area(s) and the height of the building based on the fuel load (combustible contents and burnable building components).
- (3) the level of overall fire resistance provided by the type of construction used for the building. The greater the potential fire hazards indicated as a function of the group, the lesser the height and area allowances for a particular construction type.

# 3. USE AND OCCUPANCY CLASSIFICATION

## ➤ KEY POINTS:

Occupancy classification also plays a key part in organizing and prescribing the appropriate protection measures. As such, threshold requirements for fire protection and means of egress systems are based on occupancy classification (see Chapters 9 and 10). Other sections of the code also contain requirements respective to the classification of building groups. For example, Section 706 deals with requirements for fire wall fire-resistance ratings that are tied to the occupancy classification of a building and Section 803.9 contains interior finish requirements that are dependent upon the occupancy classification. The use of the space, rather than the occupancy of the building is utilized for determining occupant loading (Section 1004) and live loading (Section 1607).



# 3. USE AND OCCUPANCY CLASSIFICATION

## ➤ CHAPTER PRELIMINARIES:

- General
- Classification
- Assembly Group A
- Business Group B
- Educational Group E
- Factory Group F
- High-Hazard Group H
- Institutional Group I
- Mercantile Group M
- Residential Group R
- Storage Group S
- Utility and Miscellaneous Group U



## 4. SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

### KEY POINTS:

Chapter 4 contains the requirements for protecting special uses and occupancies, which are supplemental to the remainder of the code. Chapter 4 contains provisions that may alter requirements found elsewhere in the code; however, the general requirements of the code still apply unless modified within the chapter. For example, the height and area limitations established in Chapter 5 apply to all special occupancies unless Chapter 4 contains height and area limitations. In this case, the limitations in Chapter 4 supersede those in other sections. An example of this is the height and area limitations for open parking garages given in Section 406.3.5, which supersede the limitations given in Section 503.

In some instances, it may not be necessary to apply the provisions of Chapter 4. For example, if a covered mall building complies with the provisions of the code for Group M, Section 402 does not apply; however, other sections that deal with a use, process or operation must be applied to that specific occupancy, such as stages and platforms, special amusement buildings and hazardous materials (Sections 410, 411 and 414).

## 4. SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

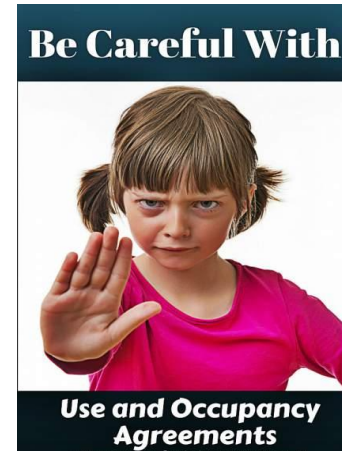
### KEY POINTS:

The chapter includes requirements for buildings and conditions that apply to one or more groups, such as high-rise buildings, underground buildings or atriums. Special uses may also imply specific occupancies and operations, such as for Group H, hazardous materials, application of flammable finishes, drying rooms, organic coatings and combustible storage or hydrogen cutoff rooms. The chapter includes requirements for buildings and conditions that apply to one or more groups, such as high-rise buildings, underground buildings or atriums. Special uses may also imply specific occupancies and operations, such as for Group H, hazardous materials, application of flammable finishes, drying rooms, organic coatings and combustible storage or hydrogen cutoff rooms, all of which are coordinated with the IFC. Unique consideration is taken for special use areas, such as covered mall buildings, motor-vehicle-related occupancies, special amusement buildings and aircraft-related occupancies. Special facilities within other occupancies are considered, such as stages and platforms, motion picture projection rooms and storm shelters. Finally, in order that the overall package of protection features can be easily understood, unique considerations for specific occupancies are addressed: Groups I-1, I-2, I-3, R-1, R-2, R-3 (by definition R-4), ambulatory care facilities and live/work units.

# 4. SPECIAL DETAILED REQUIREMENTS BASED ON USE AND OCCUPANCY

## ➤ CHAPTER PRELIMINARIES:

- Scope
- Covered Mall and Open Mall Buildings
- High-Rise Buildings
- Atriums
- Underground Buildings
- Motor-Vehicle-Related Occupancies
- Group I-2
- Group I-3
- Motion-Picture Projection Rooms
- Stages, Platforms, and Technical Production Areas
- Special Amusement Buildings
- Aircraft-Related Occupancies
- Combustible Storage



- Hazardous Materials
- Groups H-1, H-2, H-3, H-4, and H-5
- Application of Flammable Finishes
- Drying Rooms
- Organic Coatings
- Live/Work Units
- Groups I-1, R-1, R-2, R-3
- Ambulatory Care Facilities
- Storm Shelters
- Children's Play Structures

# 5. GENERAL BUILDING HEIGHTS AND AREAS

## ➤ KEY POINTS:

Chapter 5 contains the provisions that regulate the minimum type of construction for area limits and height limits based on the occupancy of the building. Height and area increases (including allowances for basements, mezzanines and equipment platforms) are permitted based on open frontage for fire department access, and the type of sprinkler protection provided and separation (Sections 503-506, 509). These thresholds are reduced for buildings over three stories in height in accordance with Section 506.4.1. Provisions include the protection and/or separation of incidental accessory occupancies (Table 508.2.5), accessory occupancies (Sections 508.2) and mixed uses in the same building (Sections 506.5, 508.3, 508.4 and 509).

Unlimited area buildings are permitted in certain occupancies when they meet special provisions (Section 507).

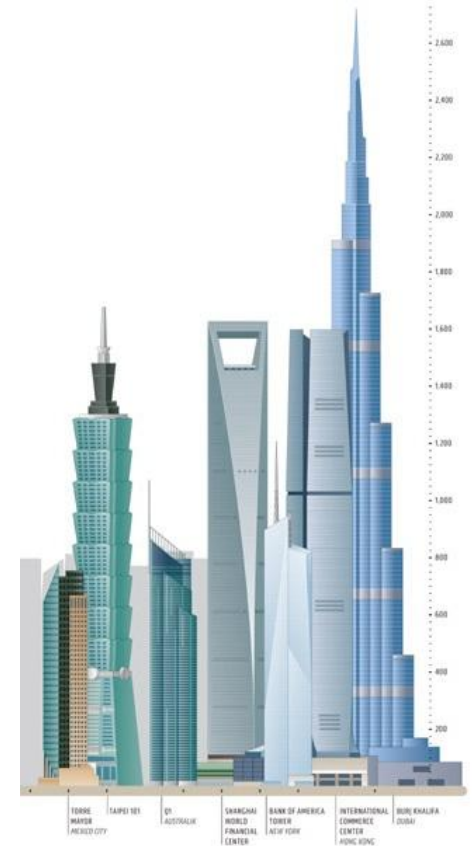
Table 503 is the keystone in setting thresholds for building size based on the building's use and the materials with which it is constructed. If one then looks at Table 503, the relationship among group classification, allowable heights and areas and types of construction becomes apparent.

Respective to each group classification, the greater the fire-resistance rating of structural elements, as represented by the type of construction, the greater the floor area and height allowances. The greater the potential fire hazards indicated as a function of the group, the lesser the height and area allowances for a particular construction type.

# 5. GENERAL BUILDING HEIGHTS AND AREAS

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- General Building Height and Area Limitations
- Building Height
- Mezzanines and Equipment Platforms
- Building Area modifications
- Unlimited-Area Buildings
- Mixed Use and Occupancy
- Incidental Uses
- Special Provisions





# 6. TYPES OF CONSTRUCTION

## ➤ KEY POINTS:

The interdependence of these fire safety considerations can be seen by first looking at Tables 601 and 602, which show the fire-resistance ratings of the principal structural elements comprising a building in relation to the five classifications for types of construction. Type I construction is the classification that generally requires the highest fire-resistance ratings for structural elements, whereas Type V construction, which is designated as a combustible type of construction, generally requires the least amount of fire-resistance-rated structural elements.

The greater the potential fire hazards indicated as a function of the group, the lesser the height and area allowances for a particular construction type. Section 603 includes a list of combustible elements that can be part of a non-combustible building (Types I and II construction).

## ➤ CHAPTER PRELIMINARIES:

- General
- Construction Classification
- Combustible Material in Type I and II Construction



# 7. FIRE AND SMOKE PROTECTION FEATURES

## ➤ KEY POINTS:

The provisions of Chapter 7 present the fundamental concepts of fire performance that all buildings are expected to achieve in some form. This chapter identifies the acceptable materials, techniques and methods by which proposed construction can be designed and evaluated against to determine a building's ability to limit the impact of fire. The fire-resistance-rated construction requirements within Chapter 7 provide passive resistance to the spread and effects of fire. Types of separations addressed include fire walls, fire barriers, fire partitions, horizontal assemblies, smoke barriers and smoke partitions. A fire produces heat that can weaken structural components and smoke products that cause property damage and place occupants at risk. The requirements of Chapter 7 work in unison with height and area requirements (Chapter 5), active fire detection and suppression systems (Chapter 9) and occupant egress requirements (Chapter 10) to contain a fire should it occur while helping ensure occupants are able to safely exit.

## 7. FIRE AND SMOKE PROTECTION FEATURES

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Fire-Resistance Ratings and Fire Tests
- Fire-Resistance Rating of Structural Members
- Exterior Walls
- Fire Walls
- Fire Barriers
- Fire Partitions
- Smoke Barriers
- Smoke Partitions
- Horizontal Assemblies
- Vertical Openings
- Penetrations
- Fire-resistant joint Systems
- Opening Protectives
- Ducts and Air Transfer Openings
- Concealed Spaces
- Fire-Resistance
- Fire-resistant requirements for Plaster
- Thermal-and Sound-Insulating Materials
- Prescriptive Fire Resistance
- Calculated Fire Resistance



# 8. INTERIOR FINISHES

## ➤ KEY POINTS:

This chapter contains the performance requirements for controlling fire growth within buildings by restricting interior finish and decorative materials. Past fire experience has shown that interior finish and decorative materials are key elements in the development and spread of fire. The provisions of Chapter 8 require materials used as interior finishes and decorations to meet certain flame-spread index or flame-propagation criteria based on the relative fire hazard associated with the occupancy. As smoke is also a hazard associated with fire, this chapter contains limits on the smoke development characteristics of interior finishes. The performance of the material is evaluated based on test standards.

# 8. INTERIOR FINISHES

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Wall and Ceiling Finishes
- Interior Floor Finish
- Combustible Materials in Types I and II Construction
- Decorative Materials and Trim
- Insulation
- Acoustical Ceiling Systems



# 9. FIRE PROTECTION SYSTEMS

## ➤ KEY POINTS:

Chapter 9 prescribes the minimum requirements for active systems of fire protection equipment to perform the following functions: detect a fire; alert the occupants or fire department of a fire emergency; and control smoke and control or extinguish the fire. Generally, the requirements are based on the occupancy, the height and the area of the building, because these are the factors that most affect fire-fighting capabilities and the relative hazard of a specific building or portion thereof. This chapter parallels and is substantially duplicated in Chapter 9 of the International Fire Code (IFC); however, the IFC Chapter 9 also contains periodic testing criteria that are not contained in the IBC. In addition, the special fire protection system requirements based on use and occupancy found in IBC Chapter 4 are duplicated in IFC Chapter 9 as a user convenience.



# 9. FIRE PROTECTION SYSTEMS

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Automatic Sprinkler Systems
- Alternative Automatic Fire-Extinguishing Systems
- Standpipe Systems
- Portable Fire Extinguisher
- Fire Alarm and Detection Systems
- Emergency Alarm systems
- Smoke-Control Systems
- Smoke and Heat Vents
- Fire Command Center
- Fire department Connections
- Fire Pumps
- Emergency Responder Safety Features
- Emergency Responder Radio Coverage



# 10. MEANS OF EGRESS

## ➤ KEY POINTS:

The general criteria set forth in Chapter 10 regulating the design of the means of egress are established as the primary method for protection of people in buildings by allowing timely relocation or evacuation of building occupants. Both prescriptive and performance language is utilized in this chapter to provide for a basic approach in the determination of a safe exiting system for all occupancies. It addresses all portions of the egress system (i.e., exit access, exits and exit discharge) and includes design requirements as well as provisions regulating individual components. The requirements detail the size, arrangement, number and protection of means of egress components. Functional and operational characteristics also are specified for the components that will permit their safe use without special knowledge or effort. The means of egress protection requirements work in coordination with other sections of the code, such as protection of vertical openings (see Chapter 7), interior finish (see Chapter 8), fire suppression and detection systems (see Chapter 9) and numerous others, all having an impact on life safety. Chapter 10 of the IBC is duplicated in Chapter 10 of the IFC; however, the IFC contains two additional sections on the means of egress system in existing buildings.

# 10. MEANS OF EGRESS

## ➤ CHAPTER PRELIMINARIES:

- Administration
- Definitions
- General Means of Egress
- Occupant Load
- Means of Egress Sizing
- Means of Egress Illumination
- Accessible Means of Egress
- Doors, Gates, and Turnstiles
- Stairways
- Ramps
- Exit Signs
- Handrails
- Guards
- Exit Access Doorways
- Exit Access Travel Distance



- Aisles
- Corridors
- Egress Balconies
- Exits
- Number of Exits and Exit Configuration
- Interior Exit Stairways and Ramps
- Exit Passageways
- Luminous Egress Path Markings
- Horizontal Exits
- Exterior Exit Stairways and Ramps
- Exit Discharge
- Assembly
- Emergency Escape and Rescue

# 11. ACCESSIBILITY

## ➤ KEY POINTS:

Chapter 11 contains provisions that set forth requirements for accessibility of buildings and their associated sites and facilities for people with physical disabilities. The fundamental philosophy of the code on the subject of accessibility is that everything is required to be accessible. This is reflected in the basic applicability requirement (see Section 1103.1). The code's scoping requirements then address the conditions under which accessibility is not required in terms of exceptions to this general mandate. While the IBC contains scoping provisions for accessibility (e.g., what, where and how many), ICC/ANSI A117.1, Accessible and Usable Buildings and Facilities, is the referenced standard for the technical provisions (i.e., how).

There are many accessibility issues that not only benefit people with disabilities, but also provide a tangible benefit to people without disabilities. This type of requirement can be set forth in the code as generally applicable without necessarily identifying it specifically as an accessibility-related issue. Such a requirement would then be considered as having been “mainstreamed.” For example, visible alarms are located in Chapter 9 and ramp requirements are addressed in Chapter 10.

# 11. ACCESSIBILITY

## ➤ KEY POINTS:

Accessibility criteria for existing buildings are addressed in Section 3411. Appendix E is supplemental information included in the code to address accessibility for items in the new Americans with Disabilities Act/Architectural Barriers Act Accessibility Guidelines (ADA/ABA) that were not typically enforceable through the standard traditional building code enforcement approach system (e.g., beds, room signage). The International Residential Code (IRC) references Chapter 11 for accessibility provisions; therefore, this chapter may be applicable to housing covered under the IRC.

# 11. ACCESSIBILITY

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Scoping Requirements
- Accessible Route
- Accessible Entrances
- Parking and Passenger Loading Facilities
- Dwelling Units and Sleeping Units
- Special Occupancies
- Other Features and Facilities
- Signage



# 12. INTERIOR ENVIRONMENT

## ➤ KEY POINTS:

Chapter 12 provides minimum standards for the interior environment of a building. The standards address the minimum sizes of spaces, minimum temperature levels, and minimum light and ventilation levels. The collection of requirements addresses limiting sound transmission through walls, ventilation of attic spaces and under floor spaces (crawl spaces). Finally, the chapter provides minimum standards for toilet and bathroom construction, including privacy shielding and standards for walls, partitions and floors to resist water intrusion and damage.



# 12. INTERIOR ENVIRONMENT

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Ventilation
- Temperature Control
- Lighting
- Yards or Courts
- Sound Transmission
- Interior Space Dimensions
- Access to Unoccupied Spaces
- Toilet and Bathroom Requirements



# 13. ENERGY EFFICIENCY

## ➤ KEY POINTS:

The purpose of Chapter 13 is to provide minimum design requirements that will promote efficient utilization of energy in buildings. The requirements are directed toward the design of building envelopes with adequate thermal resistance and low air leakage, and toward the design and selection of mechanical, water heating, electrical and illumination systems that promote effective use of depletable energy resources. For the specifics of these criteria, Chapter 13 requires design and construction in compliance with the International Energy Conservation Code (IECC).

## ➤ CHAPTER PRELIMINARIES:

- General



# 14. EXTERIOR WALLS

## ➤ KEY POINTS:

This chapter addresses requirements for exterior walls of buildings. Minimum standards for wall covering materials, installation of wall coverings and the ability of the wall to provide weather protection are provided. This chapter also requires exterior walls that are close to lot lines, or that are bearing walls for certain types of construction, to comply with the minimum fire-resistance ratings specified in Chapters 6 and 7. The installation of each type of wall covering, be it wood, masonry, vinyl, metal composite material or an exterior insulation and finish system, is critical to its long-term performance in protecting the interior of the building from the elements and the spread of fire. Special attention to the use of combustible materials on the exterior of the building such as balconies, eaves, decks and architectural trim is the focus of Section 1406.

# 14. EXTERIOR WALLS

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Performance Requirements
- Materials
- Installation of Wall Coverings
- Combustible Materials on the Exterior Side of Exterior Walls
- Metal Composite Materials (MCM)
- Exterior Insulation and Finish Systems (EIFS)
- High-pressure Decorative Exterior-grade Compact Laminates (HPL)



# 15. ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

## ➤ KEY POINTS:

Chapter 15 provides standards for both roof assemblies as well as structures which sit on top of the roof of buildings. The criteria address roof construction and covering which includes the weather-protective barrier at the roof and, in most circumstances, a fire-resistant barrier. The chapter is prescriptive in nature and is based on decades of experience with various traditional materials. These prescriptive rules are very important for satisfying performance of one type of roof covering or another. Section 1509 addresses rooftop structures including penthouses, tanks, towers and spires. Rooftop penthouses larger than prescribed in this chapter must be treated as a story under Chapter 5.

# 15. ROOF ASSEMBLIES AND ROOFTOP STRUCTURES

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Weather Protection
- Performance Requirements
- Fire Classification
- Materials
- Requirements for Roof Coverings
- Roof Insulation
- Rooftop Structures
- Reroofing
- Solar Photovoltaic Panels/modules





# 16. STRUCTURAL DESIGN

## ➤ KEY POINTS:

Chapter 16 prescribes minimum structural loading requirements for use in the design and construction of buildings and structural components. It includes minimum design loads, as well as permitted design methodologies. Standards are provided for minimum design loads (live, dead, snow, wind, rain, flood and earthquake as well as load combinations). The application of these loads and adherence to the serviceability criteria will enhance the protection of life and property. The chapter references and relies on many nationally recognized design standards.

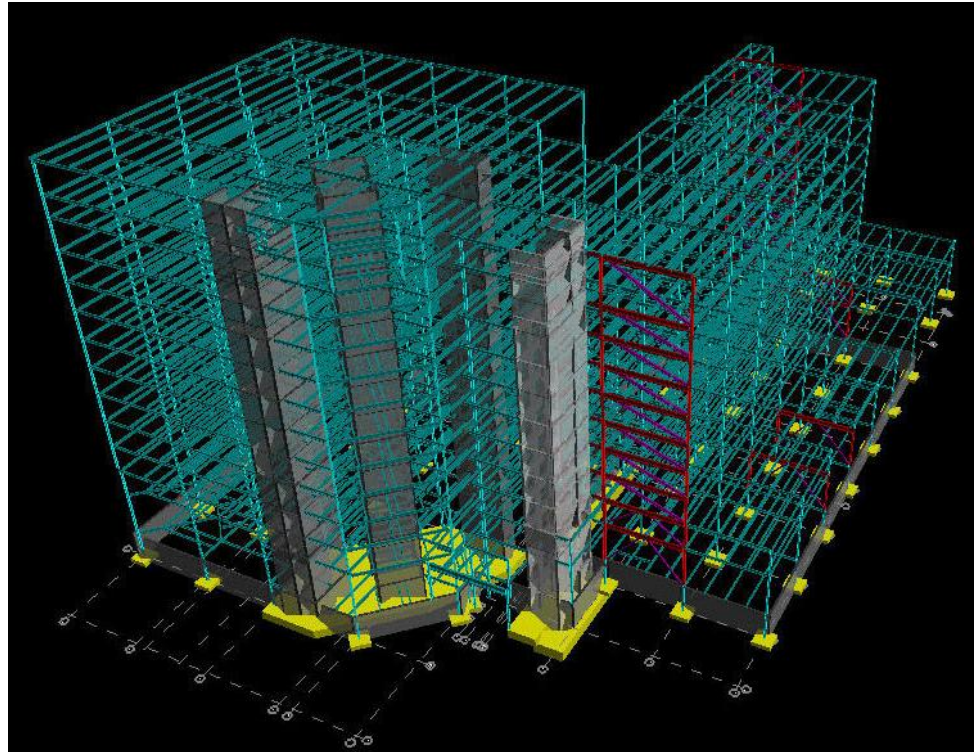
A key standard is the American Society of Civil Engineer's Minimum Design Loads for Buildings and Other Structures (ASCE 7). Structural design needs to address the conditions of the site and location. Therefore maps of rainfall, seismic, snow and wind criteria in different regions are provided.



# 16. STRUCTURAL DESIGN

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions and Notations
- Construction Documents
- General Design Requirements
- Load Combinations
- Dead Loads
- Live Loads
- Snow Loads
- Wind Loads
- Soil Lateral Loads
- Rain Loads
- Flood Loads
- Earthquake Loads
- Atmospheric Ice Loads
- Structural Integrity



# 17. SPECIAL INSPECTIONS AND TESTS

## ➤ KEY POINTS:

Chapter 17 provides a variety of procedures and criteria for testing materials and assemblies, for labeling materials and assemblies, and for special inspection of structural assemblies. This chapter expands on the requirements of Chapter 1 regarding the roles and responsibilities of the building official regarding approval of building components.

It also provides additional duties and responsibilities for the owner, contractor, design professionals and special inspectors. Proper assembly of structural components, proper quality of materials used, and proper application of materials are essential to ensuring that a building, once constructed, complies with the structural and fire-resistance minimums of the code and the approved design. To determine this compliance often requires continuous or frequent inspection and testing. Chapter 17 establishes these special inspection and testing standards as well as reporting of the work to the building official.

# 17. SPECIAL INSPECTIONS AND TESTS

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Approvals
- Special Inspections, Contractor Responsibility, and Structural Observations
- Required Verification and Inspection
- Design Strengths of Materials
- Alternate Test Procedures
- In-Situ Load Tests
- Preconstruction Load Tests
- Material and Test Standards



# 18. SOILS AND FOUNDATIONS

## ➤ KEY POINTS:

Chapter 18 contains minimum requirements for design, construction and resistance to water intrusion of foundation systems for buildings and other structures.

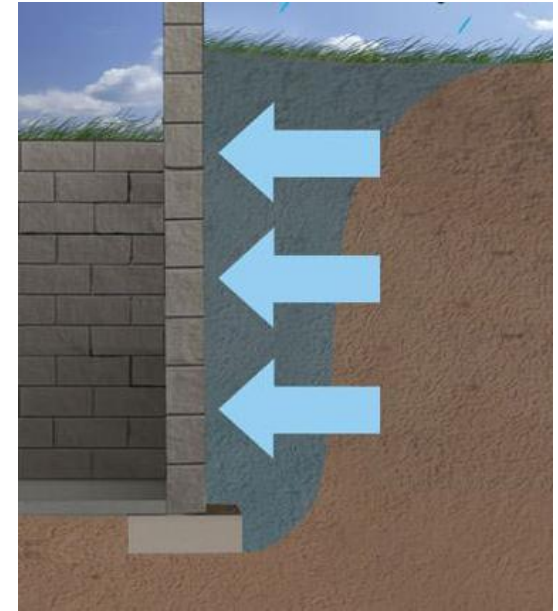
It provides criteria for the geotechnical and structural considerations in the selection and installation of adequate support for the loads transferred from the structure above. The uncertainties of foundation construction make it extremely difficult to address every potential failure within the text of the code. The chapter includes requirements for soils investigation and site preparation for receiving a foundation including the allowed load-bearing values for soils and for protecting the foundation from water intrusion.

Section 1808 addresses the basic requirements for all foundation types. Later sections address foundation requirements that are specific to shallow foundations and deep foundations. Due care must be exercised in the planning and design of foundation systems based on obtaining sufficient soils information, the use of accepted engineering procedures, experience and good technical judgment.

# 18. SOILS AND FOUNDATIONS

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Geotechnical Investigations
- Excavation, Grading, and Fill
- Dampproofing and Waterproofing
- Presumptive Load-Bearing Values of Soils
- Foundation Walls, Retaining Walls, and Embedded Posts and Poles
- Foundations
- Shallow Foundations
- Deep Foundations



# 19. CONCRETE

## ➤ KEY POINTS:

This chapter provides minimum accepted practices to the design and construction of buildings and structural components using concrete—both plain and reinforced. Chapter 19 is formatted to parallel American Concrete Institute (ACI) 318, Building Code Requirements for Structural Concrete. The chapter also includes references to additional standards. Structural concrete must be designed and constructed to comply with this code and all listed standards. There are specific sections of the chapter addressing concrete slabs, anchorage to concrete, shotcrete, reinforced gypsum concrete and concrete-filled pipe columns. Because of the variable properties of material and numerous design and construction options available in the uses of concrete, due care and control throughout the construction process is necessary.



# 19. CONCRETE

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Specifications for Tests and Materials
- Durability Requirements
- Modifications to ACI 318
- Structural Plain Concrete
- Minimum Slab Provisions
- Anchorage to Concrete-Allowable Stress Design
- Anchorage to Concrete-Strength Design
- Shotcrete
- Reinforced Gypsum Concrete
- Concrete-filled Pipe Columns





# 20. ALUMINUM

## ➤ KEY POINTS:

Chapter 20 contains standards for the use of aluminum in building construction.

Only the structural applications of aluminum are addressed. The chapter does not address the use of aluminum in specialty products such as storefront or window framing or architectural hardware. The use of aluminum in heating, ventilating or air-conditioning systems is addressed in the International Mechanical Code (IMC). The chapter references national standards from the Aluminum Association for use of aluminum in building construction, AA ASM 35, Aluminum Sheet Metal Work in Building Construction, and AA ADM 1, Aluminum Design Manual. By utilizing the standards set forth, a proper application of this material can be obtained.



## ➤ CHAPTER PRELIMINARIES:

- General
- Materials

# 21. MASONRY

## ➤ KEY POINTS:

This chapter provides comprehensive and practical requirements for masonry construction. The provisions of Chapter 21 require minimum accepted practices and the use of standards for the design and construction of masonry structures. The provisions address:

- Material specifications and test methods; types of wall construction; criteria for engineered.
- Empirical designs; required details of construction including the execution of construction.

Masonry design methodologies including allowable stress design, strength design and empirical design are covered by provisions of the chapter. Also addressed are masonry fireplaces and chimneys, masonry heaters and glass unit masonry. Fire-resistant construction using masonry is also required to comply with Chapter 7. Masonry foundations are also subject to the requirements of Chapter 18.

# 21. MASONRY

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions and Notations
- Masonry Construction Materials
- Construction
- Quality Assurance
- Seismic Design
- Allowable Stress Design
- Strength Design of Masonry
- Empirical Design of Masonry
- Glass Unit Masonry
- Masonry Fireplaces
- Masonry Heaters
- Masonry Chimneys



# 22. STEEL

## ➤ KEY POINTS:

Chapter 22 provides the requirements necessary for the design and construction of structural steel (including composite construction), cold-formed steel, steel joists, steel cable structures and steel storage racks. The chapter specifies appropriate design and construction standards for these types of structures. It also provides a road map of the applicable technical requirements for steel structures. Steel is a noncombustible building material commonly associated with Types I and II construction; however, it is permitted to be used in all types of construction. The code requires that materials used in the design of structural steel members conform to designated national standards. Chapter 22 is involved with the design and use of steel materials using the specifications and standards of the American Institute for Steel Construction, the American Iron and Steel Institute, the Steel Joist Institute and the American Society of Civil Engineers.

# 22. STEEL

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Identification and Protection of Steel for Structural Purposes
- Connections
- Structural Steel
- Composite Structural Steel and Concrete Structures
- Steel Joists
- Steel Cable Structures
- Steel Storage Racks
- Cold-Formed Steel
- Cold-Formed Steel Light-Framed Construction



## 23. WOOD

### ➤ KEY POINTS:

This chapter provides minimum guidance for the design of buildings and structures that use wood and wood-based products in their framing and fabrication. The chapter is organized around three design methodologies: allowable stress design (ASD), load and resistance factor design (LRFD) and conventional light-frame construction. Included in the chapter are references to design and manufacturing standards for various wood and wood-based products; general construction requirements; design criteria for lateral force-resisting systems and specific requirements for the application of the three design methods. In general, only Type III, IV or V buildings may be constructed of wood. Accordingly Chapter 23 is referenced when the combination of the occupancy (determined in Chapter 3) and the height and area of the building (determined in Chapter 5) indicate that construction can be Type III, IV or V.

# 23. WOOD

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Minimum Standards and Quality
- General Construction Requirements
- General Design Requirements for Lateral-Force-Resisting Systems
- Allowable Stress Design
- Load and Resistance Factor Design
- Conventional Light-Frame Construction





# 24. GLASS AND GLAZING

## ➤ KEY POINTS:

This chapter establishes regulations for glass and glazing used in buildings and structures that, when installed, are subjected to wind, snow and dead loads. Engineering and design requirements are included in the chapter. Additional structural requirements are found in Chapter 16. A second concern of this chapter is glass and glazing used in areas where it is likely to have an impact on the occupants. Section 2406 identifies hazardous locations where glazing installed must either be safety glazing or blocked to prevent human impact. Safety glazing must meet stringent standards and be appropriately marked or identified. Additional standards for glass and glazing in guards, handrails, elevator hoistways and elevator cars, and in athletic facilities are provided.

# 24. GLASS AND GLAZING

## ➤ CHAPTER PRELIMINARIES:

- General
- Definition
- General Requirements for Glass
- Wind, Snow, Seismic, and Dead Loads on Glass
- Sloped Glazing and Skylights
- Safety Glazing
- Glass in Handrails and Guards
- Glazing in Athletic Facilities
- Glazing in Elevator Hoistways and Elevator Cars



# 25. GYPSUM BOARD, GYPSUM PANEL PRODUCTS, AND PLASTER

## ➤ KEY POINTS:

Chapter 25 contains the provisions and referenced standards that regulate the design, construction and quality of gypsum board and plaster. These represent the most common interior and exterior finish materials in the building industry. This chapter primarily addresses quality-control-related issues with regard to material specifications and installation requirements. Most products are manufactured under the control of industry standards.

The building official or inspector primarily needs to verify that the appropriate product is used and properly installed for the intended use and location. While often simply used as wall and ceiling coverings, proper design and application are necessary to provide weather resistance and required fire protection for both structural and nonstructural building components.

# 25. GYPSUM BOARD AND PLASTER

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Inspection
- Vertical and Horizontal Assemblies
- Shear Wall Construction
- Gypsum Board Materials
- Lathing and Plastering
- Gypsum Construction
- Gypsum Board in Showers and Water Closets
- Lathing and Furring for Cement Plaster (Stucco)
- Interior Plaster
- Exterior Plaster
- Exposed Aggregate Plaster



# 26. PLASTIC

## ➤ KEY POINTS:

The use of plastics in building construction and components is addressed in Chapter 26. This chapter provides standards addressing foam plastic insulation, foam plastics used as interior finish and trim, and other plastic veneers used on the inside or outside of a building. Plastic siding is regulated by Chapter 14. Sections 2606 through 2611 address the use of light-transmitting plastics in various configurations such as walls, roof panels, skylights, signs and as glazing.

Requirements for the use of fiber-reinforced polymers, fiberglass reinforced polymers and reflective plastic core insulation are also contained in this chapter. Some plastics exhibit rapid flame spread and heavy smoke density characteristics when exposed to fire. Additionally, exposure to the heat generated by a fire can cause some plastics to deform, which can affect their performance. The requirements and limitations of this chapter are necessary to control the use of plastic and foam plastic products such that they do not compromise the safety of building occupants.

# 26. PLASTIC

## ➤ CHAPTER PRELIMINARIES:

- General
- Definition
- Foam Plastic Insulation
- Interior Finish and Trim
- Plastic Veneer
- Light-Transmitting Plastics
- Light-Transmitting Plastic Wall Panels
- Light-Transmitting Plastic Glazing
- Light-Transmitting Plastic Roof Panels
- Light-Transmitting Plastic Skylight Glazing
- Light-Transmitting Plastic Interior Signs
- Fiber-reinforce Polymer
- Reflective Plastic Core Insulation



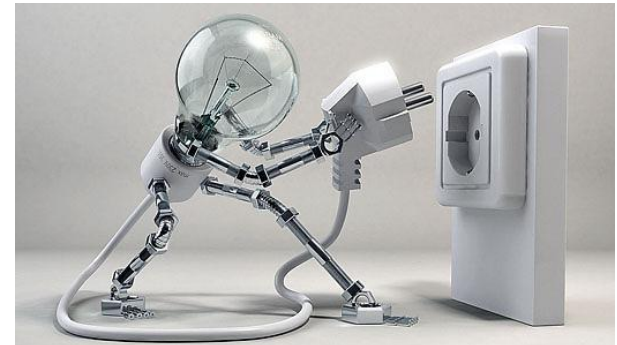
# 27. ELECTRICAL

## ➤ KEY POINTS:

Since electrical systems and components are an integral part of almost all structures, it is necessary for the code to address the installation of such systems. For this purpose, Chapter 27 references the National Electrical Code (NEC). In addition, Section 2702 addresses emergency and standby power requirements. Such systems must comply with the International Fire Code (IFC) and referenced standards. This section also provides references to the various code sections requiring emergency and standby power, such as high-rise buildings and buildings containing hazardous materials.

## ➤ CHAPTER PRELIMINARIES:

- General
- Emergency and Standby Power Systems





# 28. MECHANICAL SYSTEMS

## ➤ KEY POINTS:

Nearly all buildings will include mechanical systems. This chapter provides references to the International Mechanical Code (IMC) and the International Fuel Gas Code (IFGC) for the design and installation of mechanical systems. In addition, the chapter references Chapter 21 of the IBC for masonry chimneys, fireplaces and barbecues.

## ➤ CHAPTER PRELIMINARIES:

- General





# 29. PLUMBING SYSTEMS

## ➤ KEY POINTS:

Chapter 29 regulates the minimum number of plumbing fixtures that must be provided for every type of building. This chapter also regulates the location of the required fixtures in various types of buildings. This section requires separate facilities for males and females except for certain types of small occupancies. The regulations in this chapter come directly from Chapters 3 and 4 of the International Plumbing Code (IPC).

## ➤ CHAPTER PRELIMINARIES:

- General
- Minimum Plumbing Facilities



# 30. ELEVATORS AND CONVEYING SYSTEMS

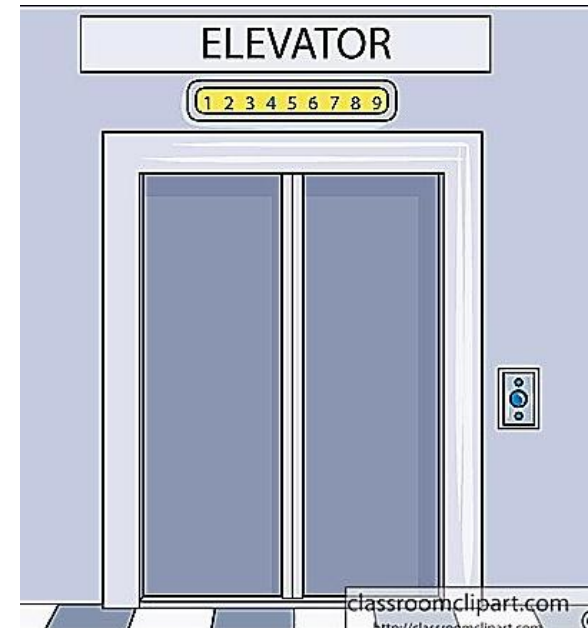
## ➤ KEY POINTS:

Chapter 30 provides standards for the installation of elevators into buildings. Referenced standards provide the requirements for the elevator system and mechanisms. Detailed standards are provided in the chapter for hoistway enclosures, hoistway venting and machine rooms. New provisions are added in the 2009 IBC for Fire Service Access Elevators required in high-rise buildings and for the optional choice of Occupant Evacuation Elevators (see Section 403).

# 30. ELEVATORS AND CONVEYING SYSTEMS

## ➤ CHAPTER PRELIMINARIES:

- General
- Hoistway Enclosures
- Emergency Operations
- Hoistway Venting
- Conveying Systems
- Machine Rooms
- Fire Service Access Elevator
- Occupant Evacuation Elevators



# 31. SPECIAL CONSTRUCTION

## ➤ KEY POINTS:

Chapter 31 contains a collection of regulations for a variety of unique structures and architectural features. Pedestrian walkways and tunnels connecting two buildings are addressed in Section 3104. Membrane and air-supported structures are addressed by Section 3102. Safeguards for swimming pool safety are found in Section 3109. Standards for temporary structures, including permit requirements are provided in Section 3103. Structures as varied as awnings, marquees, signs, telecommunication and broadcast towers and automatic vehicular gates are also addressed (see Sections 3105 through 3108 and 3110).

# 31. SPECIAL CONSTRUCTION

## ➤ CHAPTER PRELIMINARIES:

- General
- Membrane Structures
- Temporary Structures
- Pedestrian Walkways and Tunnels
- Awnings and Canopies
- Marquees
- Signs
- Telecommunication and Broadcast Towers
- Swimming Pool Enclosures and Safety Devices
- Automatic Vehicular Gates
- Solar Photovoltaic Panels/modules



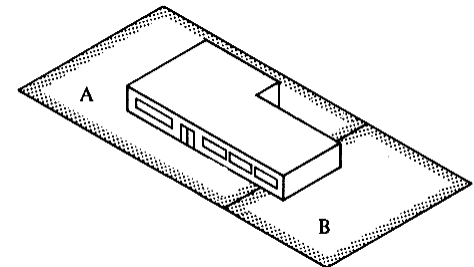
## 32. ENCROACHMENTS INTO THE PUBLIC RIGHT-OF-WAY

### ➤ KEY POINTS:

Buildings and structures from time to time are designed to extend over a property line and into the public right-of-way. Local regulations outside of the building code usually set limits to such encroachments, and such regulations take precedence over the provisions of this chapter. Standards are provided for encroachments below grade for structural support, vaults and areaways. Encroachments above grade are divided into below 8 feet, 8 feet to 15 feet, and above 15 feet, because of headroom and vehicular height issues. This includes steps, columns, awnings, canopies, marquees, signs, windows, balconies. Similar architectural features above grade are also addressed. Pedestrian walkways must also comply with Chapter 31.

### ➤ CHAPTER PRELIMINARIES:

- General
- Encroachments



# 33. SAFEGUARDS DURING CONSTRUCTION

## ➤ KEY POINTS:

Chapter 33 provides safety requirements during construction and demolition of buildings and structures. These requirements are intended to protect the public from injury and adjoining property from damage. In addition the chapter provides for the progressive installation and operation of exit stairways and standpipe systems during construction.



# 33. SAFEGUARDS DURING CONSTRUCTION

## ➤ CHAPTER PRELIMINARIES:

- General
- Construction Safeguards
- Demolition
- Site Work
- Sanitary
- Protection of Pedestrians
- Protection of Adjoining Property
- Temporary Use of Streets, Alleys, and Public Property
- Fire Extinguishers
- Means of Egress
- Standpipes
- Automatic Sprinkler System
- Water Supply for Fire Protection



# 34. EXISTING STRUCTURES

## ➤ KEY POINTS:

The provisions in Chapter 34 deal with alternative methods or reduced compliance requirements when dealing with existing building constraints. This chapter allows for a controlled departure from full compliance with the technical codes, without compromising the minimum standards for fire prevention and life safety features of the rehabilitated building.

Provisions are divided by addition, alterations, repairs, change of occupancy and moved structures. There are further allowances for registered historic buildings. There are also special allowances for replacement of existing stairways, replacement of glass and accessibility requirements. The fire escape requirements in Section 3406 are consistent with the fire escape requirements in Section 1030 of the International Fire Code (IFC).

# 34. EXISTING STRUCTURES

## ➤ KEY POINTS:

Section 3412, Compliance Alternatives, allows for existing buildings to be evaluated so as to show that alterations, while not meeting new construction requirements, will improve the current existing situation. Provisions are based on a numerical scoring system involving 18 various safety parameters and the degree of code compliance for each issue.

Chapter 34 is repeated in the International Existing Building Code (IEBC). Sections 3402 through 3409 are repeated as IEBC Chapter 3 and Section 3410 as Chapter 13.

# 34. EXISTING STRUCTURES

## ➤ CHAPTER PRELIMINARIES:

- General
- Definitions
- Additions
- Alterations
- Repairs
- Fire Escapes
- Glass Replacement
- Change of Occupancy
- Historic Buildings
- Moved Structures
- Accessibility for Existing Buildings
- Compliance Alternatives



# 35. REFERENCED STANDARDS

## ➤ KEY POINTS:

The code contains numerous references to standards that are used to regulate materials and methods of construction. Chapter 35 contains a comprehensive list of all standards that are referenced in the code, including the appendices. The standards are part of the code to the extent of the reference to the standard (see Section 102.4). Compliance with the referenced standard is necessary for compliance with this code. By providing specifically adopted standards, the construction and installation requirements necessary for compliance with the code can be readily determined. The basis for code compliance is, therefore, established and available on an equal basis to the building code official, contractor, designer and owner.

# 35. REFERENCED STANDARDS

## ➤ KEY POINTS:

Chapter 35 is organized in a manner that makes it easy to locate specific standards. It lists all of the referenced standards, alphabetically, by acronym of the promulgating agency of the standard.

Each agency's standards are then listed in either alphabetical or numeric order based upon the standard identification. The list also contains the title of the standard; the edition (date) of the standard referenced; any addenda included as part of the ICC adoption; and the section or sections of this code that reference the standard.





# EASY GUIDE



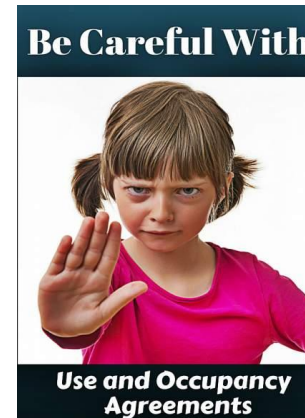
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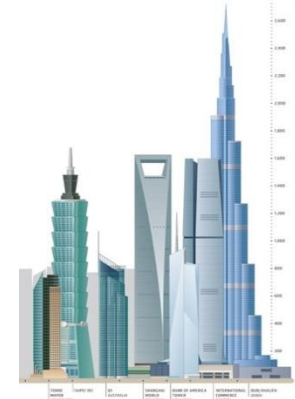
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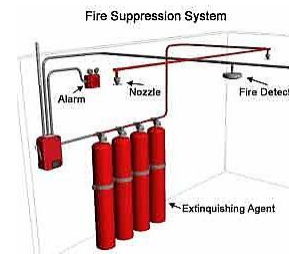
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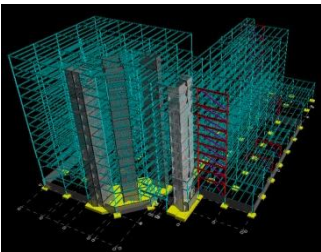
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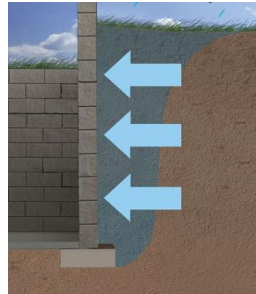
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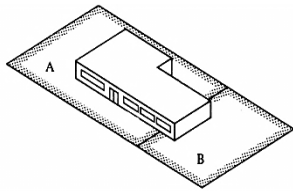
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## Chapter- 35

Thank  
You

